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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/086,543	03/04/2002	Daisuke Kojima	112117	2272

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EXAMINER

PIZIALI, JEFFREY J

ART UNIT	PAPER NUMBER
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2673

DATE MAILED: 03/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/086,543	KOJIMA ET AL.	
	Examiner	Art Unit	
	Jeff Piziali	2673	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 December 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) 3,4,6-11,14-29,31,32,34 and 35 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,5,12,13,30 and 33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 June 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Claims 3-4, 6-11, 14-29, 31, 32, 34, and 35 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected species, there being no allowable generic or linking claim. Applicants timely traversed the restriction (election) requirement in the reply filed 24 August 2004.

2. Applicants' election with traverse of Species I in the reply filed 24 August 2004 is acknowledged. The traversal is on the ground that the subject matter of all species is sufficiently related that a thorough search for the subject matter of any one species would encompass a search for the subject matter of the remaining species. This is not found persuasive because MPEP §808.01(a), regarding Species Requirement states, "Since the claims are directed to independent inventions, restriction is proper pursuant to 35 U.S.C. 121, and *it is not necessary to show a separate status in the art or separate classification*" (emphasis added). While the field of search for one species may well overlap the field of search for another species, this does not alter the fact that each species constitutes an independent and distinct invention.

The requirement is still deemed proper and is therefore made FINAL.

3. This application contains claims 3-4, 6-11, 14-29, 31, 32, 34, and 35 drawn to an invention nonelected with traverse in the reply filed 24 August 2004. A complete reply to the

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final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

4. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Continued Examination Under 37 CFR 1.114

5. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicants' submission filed on 20 December 2005 has been entered.

Priority

6. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

7. The drawings were received on 23 June 2005. These drawings are acceptable.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 1, 2, 5, 12, 13, 30, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirakawa et al. (US 6,097,358) in view of Tanaka et al. (US 6,052,112 A).

Regarding claim 1, Hirakawa discloses a driving method of an electro-optic element [Fig. 1; C] for allowing said electro-optic element to display a level of grayscale, said electro-optic element displaying throughout a frame period [Fig. 3; F] by switching ON-state said electro-optic element during a period corresponding to grayscale data that defines said level of grayscale, said method comprising: sequentially selecting, according to said grayscale data, a plurality of first sub-field periods [Fig. 3; SF1-SF5] continuous with respect to one another and a plurality of second sub-field periods [Fig. 3; SF6-SF10] continuous with respect to one another used for securing a period corresponding to said grayscale data, said plurality of second sub-field periods following consecutively said plurality of first sub-field periods, each of said plurality of second sub-field periods substantially corresponding to a length of a sum of said plurality of first sub-field periods and any one of the first sub-field periods, in a direction from a first sub-field period and a second sub-field period positioned on a boundary [Fig. 3; TR] of said plurality of first sub-field periods and said plurality of second sub-field periods toward a first sub-field period and a second sub-field period at a position most remote from said boundary; and driving

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by switching ON-state said electro-optic element during said sub-field periods selected (see Column 6, Line 23 - Column 9, Line 21). Hirakawa teaches the electro-optic element being an AC-driven plasma display panel cell, but does not expressly disclose the electro-optic element being a liquid crystal element.

However, Tanaka does disclose substituting an AC-driven plasma display with a liquid crystal display. Hirakawa and Tanaka are analogous art, because they are from the shared field of sub-field gradation driving schemes. Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to use Tanaka's liquid crystal elements as Hirakawa's plasma display panel elements, so as provide stable operation of an alternate, commercially popular display device.

Regarding claim 2, Hirakawa discloses said plurality of first sub-field periods and said plurality of second sub-field periods being included in a same frame period (see Column 7, Lines 57-65).

Regarding claim 5, Hirakawa discloses a period during which said electro-optic element is switched ON-state being inserted in said boundary regardless of said grayscale data (see Fig. 3; Column 8, Lines 44-67).

Regarding claim 12, Hirakawa discloses said grayscale data being composed of N bits (N is an integer not less than 2) to define a level of grayscale having 2 to the N^{th} power kinds; high-order M bits in said N bits defining a level of grayscale said plurality of second sub-field periods

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should display; low-order (N-M) bits in said N bits defining a level of grayscale said plurality of first sub-field periods should display; and said M is an optimal solution of M given on an assumption that said frame period includes $(2^{N-M}-1)$ first sub-field periods (see Column 6, Line 23 - Column 9, Line 21).

Regarding claim 13, Hirakawa discloses said grayscale data being composed of N bits (N is an integer not less than 2) to define a level of grayscale having 2 to the N^{th} power kinds; a length of each of said second sub-field periods being equal to a length of a period to display a level of grayscale defined by a least significant bit in high-order M bits in said N bits; the number of said plurality of second sub-field periods being equal to a maximum value specified by said M bits; a length of each of said first sub-field periods being equal to a length of a period to display a level of grayscale defined by a least significant bit in low-order (N-M) bits in said N bits; and the number of said plurality of first sub-field periods being equal to a maximum value specified by said (N-M) bits (see Column 6, Line 23 - Column 9, Line 21).

Regarding claim 30, this claim is rejected by the reasoning applied to claim 1; furthermore Hirakawa discloses a driving device [Fig. 1; 80] of an electro-optic element [Fig. 1; C] for allowing said electro-optic element to display a level of grayscale said electro-optic element displays throughout a frame period [Fig. 3; F] by switching ON-state said electro-optic element during a period corresponding to grayscale data that defines said level of grayscale, said device comprising: a selecting circuit that sequentially selects, according to said grayscale data, a plurality of first sub-field periods [Fig. 3; SF1-SF5] continuous with respect to one another and a

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plurality of second sub-field periods [Fig. 3; SF6-SF10] continuous with respect to one another used for specifying the period corresponding to said grayscale data, said plurality of second sub-field periods following consecutively said plurality of first sub-field periods, each of said plurality of second sub-field periods substantially corresponding to a length of a sum of said plurality of first sub-field periods and any one of first sub-field periods, in a direction from a first sub-field period and a second sub-field period positioned on a boundary [Fig. 3; TR] of said plurality of first sub-field periods and said plurality of second sub-field periods toward a first sub-field period and a second sub-field period at a remotest position from said boundary; and a driving circuit that switches ON-state said electro-optic element during said subfield periods selected (see Column 6, Line 23 - Column 9, Line 21). Hirakawa teaches the electro-optic element being an AC-driven plasma display panel cell, but does not expressly disclose the electro-optic element being a liquid crystal element.

However, Tanaka does disclose substituting an AC-driven plasma display with a liquid crystal display. Hirakawa and Tanaka are analogous art, because they are from the shared field of sub-field gradation driving schemes. Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to use Tanaka's liquid crystal elements as Hirakawa's plasma display panel elements, so as provide stable operation of an alternate, commercially popular display device.

Regarding claim 33, Hirakawa discloses electronic equipment, comprising: a display device [Fig. 1; 100], including a plurality of electro-optic elements aligned in a matrix [Fig. 1; 1], that displays an image related to said electronic equipment (see Column 6, Lines 23-67).

10. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Response to Arguments

11. Applicants' arguments filed 20 December 2005 have been fully considered but they are not persuasive. The applicants contend, "Although the sub-pixels may arguably be selected in sequential order, e.g. from SF1 to SF10, Hirakawa does not teach or suggest that the sub-pixels are sequentially selected in directions from a first sub-field period SF5 and a second sub-field period SF6 positioned on a boundary TR of the plurality of first sub-field periods SF1-SF5 and the plurality [of] second sub-field periods SF6-SF10 toward a first sub-field period SF1 and a second sub-field period SF10 at a position most remote from the boundary TR" (see Page 14 of the Remarks filed 20 December 2005).

However, the examiner respectfully counters that Hirakawa does indeed disclose sequentially selecting in a direction from a first sub-field period [Fig. 3; SF5 in the first display frame/field "F," for instance] and a second sub-field period [Fig. 3; SF6 in the first display frame/field "F," for instance] positioned on a boundary [Fig. 3; the TR between SF5 and SF6 in

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the first display frame/field "F," for instance] of the plurality of first sub-field periods [Fig. 3; SF1-SF5 in the first display frame/field "F," for instance] and the plurality of second sub-field periods [Fig. 3; SF6-SF10 in the first display frame/field "F," for instance] toward a first sub-field period [Fig. 3; SF1 in the second display frame/field "F," for instance] and a second sub-field period [Fig. 3; SF10 in the second display frame/field "F," for instance] at a position most remote from the boundary (see Fig. 3; Column 7, Line 55 - Column 8, Line 22 -- wherein the second display frame must inherently follow the aforementioned first display frame), as presently claimed.

The applicants further argue Hirakawa fails to disclose each of the plurality of second sub-field periods substantially corresponding to a length of a sum of the plurality of first sub-field periods and any one of the first sub-field periods (see Page 15 of the Remarks filed 20 December 2005). Again, the examiner respectfully disagrees. The applicants state, "Hirakawa teaches that a weight of luminance of each of the sub-fields [Fig. 3; SF6-SF10] of the second group [Fig. 3; SFG2] is an integer multiple of the minimum weight '1' and equal to one plus the total sum of the weights smaller than themselves ($1 + (\text{the sum of the weights in the first sub-field group [Fig. 3; SFG1]}$), i.e., $6 = (1 \times 5) + 1$ " (see Page 16, Lines 16-19 of the Remarks filed 31 January 2005). However, the applicants also assert, "Hirakawa teaches that the term 'weighted luminance' corresponds to a luminance weight of the sub-field, e.g., number of discharges in a sub-field, not 'lengths' of a period for discharge" (see Page 15 of the Remarks filed 20 December 2005).

However, while the examiner concurs Hirakawa teaches that "a weighted luminance" represents a "number of discharges" (see Column 1, Lines 59-65). Knowing that each such

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discharge must necessarily and inherently constitute a "length of a period" (that is to say, a discharge requires a certain period of time to execute), Hirakawa does indeed disclose each of the plurality of second sub-field periods [Fig. 3; SF6-SF10, for instance] substantially corresponding to a length of a sum of the plurality of first sub-field periods [Fig. 3; SF1-SF5, for instance] and any one of the first sub-field periods [Fig. 3; SF1, for instance] (see Column 7, Line 57 - Column 8, Line 22 -- i.e. (6 discharge periods = (1 x 5 discharge periods) + 1 discharge period), for instance).

On a separate but related note, the applicants have, "requested that claims 3-11 be rejoined upon allowance of independent claim 1" (see the bottom of Page 15 of the Remarks filed 20 December 2005). Claim 1 remains rejected at this time, formally rendering this request moot at the moment. However, the applicants are respectfully advised that withdrawn claims 3, 4, and 6-11 all still include the old "electro-optic element" subject matter that existed in claim 1 prior to the Amendment submitted 20 December 2005. Therefore, even if claim 1 were arguably allowed (which it isn't), and claims 3, 4, and 6-11 ever rejoined; those same dependent claims would still be rejected under the second paragraph of 35 U.S.C. 112 for a lack of antecedent basis. As such, if the applicants continue pursuing a rejoinder of claims, they are respectfully encouraged to amend such withdrawn claims to keep current with any pending base claim amendments.

By such reasoning, rejection of the claims is deemed necessary, proper, and thereby maintained at this time.

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Conclusion


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeff Piziali whose telephone number is (571) 272-7678. The examiner can normally be reached on Monday - Friday (6:30AM - 3PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bipin Shalwala can be reached on (571) 272-7681. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



J.P.
28 February 2006



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